MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 1597a
MSDS Number: 1597a
SRM Name: Complex Mixture of Polycyclic Aromatic Hydrocarbons from Coal Tar

Date of Issue: 06 January 2006

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Description: Standard Reference Material (SRM) 1597a consists of a mixture of polycyclic aromatic hydrocarbons (PAHs)[1] isolated from a coal tar sample and dissolved in toluene. A unit of SRM 1597a consists of three ampoules, each containing 1.3 mL of material.

Substance: Polycyclic Aromatic Hydrocarbons from Coal Tar in Toluene

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS[1]

Component:	**Toluene**
Other Designations:	**Toluene** (methylbenzene; 1-methylbenzene; methylbenzol; toluol; methyl benzene; toluene)
CAS Number:	108-88-3
EC Number (EINECS):	203-625-9
SRM Nominal Concentration (mass %):	> 99
EC Classification:	F, Xn, Xi Reproductive Toxin Category 3
EC Risk (R No.):	11, 38, 48/20, 63, 65, 67
EC Safety (S No.):	2, 36/37, 46, 62

Component:	**Naphthalene**
Other Designations:	**Naphthalene** (naphthaline; camphor tar; naphthalene; naphthene; moth flakes; moth balls; white tar)
CAS Number:	91-20-3
EC Number (EINECS):	202-049-5
SRM Nominal Concentration (mass %):	0.103
EC Classification:	Xn, N Carcinogen Category 3
EC Risk (R No.):	22, 40, 50/53
EC Safety (S No.):	2, 36/37, 46, 60, 61

[1] Hazardous components 1 % or greater; Carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200. For the list and actual concentration of hazardous PAHs less than 1 %, and carcinogen PAHs less than 0.1 % which are below the reportable limit, refer to the corresponding Certificate of Analysis.

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2 Fire = 3 Reactivity = 0

Major Health Hazards: Respiratory tract, skin and eye irritation. Aspiration hazard. Central nervous system depression. Nerve damage.

Physical Hazards: Flammable liquid and vapor. Vapor may cause a flash fire.

Potential Health Effects

Inhalation: Inhalation (acute exposure) of toluene with exposure to 100 ppm may cause irritation; 200 ppm to 600 ppm, up to 8 hours may cause fatigue, confusion, headache, nausea, dizziness, and impaired coordination. Exposure to 800 ppm may cause irritation, nasal mucous secretion, metallic taste, drowsiness, and impaired balance. Prolonged exposure may cause mucous membrane irritation, vomiting, insomnia, nosebleeds, chest pains, euphoria, headache, nausea, loss of coordination, impaired speech, vision, and or hearing, and abnormal bleeding.

Skin Contact: Skin contact with toluene may cause irritation. Vapors may cause skin to dry. Prolonged or repeated contact may cause dermatitis.

Eye Contact: Eye contact with toluene may cause irritation and corneal burns if not promptly removed. Concentrations of 300 ppm to 800 ppm may cause irritation and lacrimation. Repeated or prolonged exposure may cause conjunctivitis.

Ingestion: Aspiration of toluene into the lungs causes lung damage and may be fatal. The approximate lethal dose in humans is 15 mL to 30 mL.

Listed as a Carcinogen/ Potential Carcinogen:

Toluene

Yes	No	
	X	
	X	In the National Toxicology Program (NTP) Report on Carcinogens.
	X	In the International Agency for Research on Cancer (IARC) Monographs.
		By the Occupational Safety and Health Administration (OSHA).

Naphthalene

Yes	No	
X		In the National Toxicology Program (NTP) Report on Carcinogens.
X		In the International Agency for Research on Cancer (IARC) Monographs.
	X	By the Occupational Safety and Health Administration (OSHA).

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration, if not breathing, by qualified personnel. Get immediate medical attention.

Skin Contact: Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: Get immediate medical attention. **DO NOT** induce vomiting. If vomiting occurs, keep head lower than hips to prevent aspiration. Give artificial respiration, if not breathing, by qualified personnel.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Toluene is a severe fire hazard. Naphthalene is a moderate fire hazard. Vapors, which are heavier that air, may ignite from distant ignition sources. Flash backs may occur. Flow or agitation of toluene may generate electrostatic discharges, which may ignite or explode.

Extinguishing Media: Regular dry chemical. Carbon dioxide. Water. Regular foam.

Fire Fighting: Move container from fire area if it can be done without risk. Use water spray to cool containers until well after the fire is out and to discharge vapors. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Toluene

Flash Point: 4 °C (39 °F)

Method Used: Closed cup.

Autoignition Temp.: 480 °C (896 °F)

Flammability Class (OSHA): IB

Flammability Limits in Air

UPPER (Volume %): 7.1

LOWER (Volume %): 1.2

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Avoid flames, sparks, and other sources of ignition. Reduce vapors with water spray. Collect small spilled material after absorbing with sand or other non-combustible material in an appropriate container for disposal. For large spills, stop leak if possible without personal risk. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to the Release Quantity (RQ). Keep out of water supplies and sewers.

Reportable Quantity: Toluene is subject to reportable quantities (RQ) under Title III of SARA, which is greater than the unit quantity provided for SRM 1597a. See Section 15, "Regulatory Information".

Disposal: Refer to Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Store in a tightly closed container. Keep separated from incompatible substances. Refer to SRM 1597a Certificate of Analysis for storage of SRM 1597a.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Toluene

OSHA (PEL): 200 ppm TWA
OSHA (PEL): 300 ppm ceiling
ACGIH: 50 ppm TWA (skin)
NIOSH: 375 mg/m^3 (100 ppm) recommended TWA (10 h)
NIOSH: 560 mg/m^3 recommended STEL (150 ppm)
UK WEL: 191 mg/m^3 (50 ppm) TWA (skin)
UK WEL: 574 mg/m^3 (150 ppm) STEL (skin)

Naphthalene

OSHA (PEL): 50 mg/m3 (10 ppm) TWA
ACGIH: 10 ppm TWA (skin)
ACGIH: 15 ppm STEL (skin)
NIOSH: 50 mg/m^3 (10 ppm) recommended TWA (10 h)
NIOSH: 75 mg/m^3 (15 ppm) recommended STEL
EC OEL: 50 mg/m^3 (10mL/m^3)
UK WEL: Chemical Hazard Alert Notice issued; Control exposure by all routes to levels as low as possible.

Ventilation: Use local exhaust ventilation system. Ensure compliance with applicable exposure limits. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present.

Respirator:	If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators with organic vapor cartridges certified by NIOSH.
Eye Protection:	Wear safety goggles. An eye wash station should be readily available near areas of use.
Personal Protection:	Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component:	**Toluene**
Appearance and Odor:	Liquid. Colorless. Distinct odor.
Relative Molecular Mass:	92.14
Molecular Formula:	$C_6H_5CH_3$
Boiling Point:	111 °C (232 °F)
Freezing Point:	–95 °C (–139 °F)
Volatility:	100 %
Density:	0.8669 g/cm^3
Water Solubility:	0.05 % @ 20 °C
Solvent Solubility:	Soluble in alcohol, ether, benzene, chloroform, ligroin, acetic acid, carbon disulfide, and acetone.
Odor Threshold:	10 ppm to 15 ppm
Component:	**Naphthalene**
Appearance and Odor:	Solid. White crystals or flakes. Mothball odor.
Relative Molecular Mass:	128.16
Molecular Formula:	$C_{10}H_8$
Boiling Point:	218 °C (424 °F)
Melting Point:	80 °C (176 °F)
Density:	1.162 g/cm^3 @ 20 °C
Water Solubility:	Insoluble @ 20 °C
Solvent Solubility:	Soluble in benzene, carbon tetrachloride, fixed & volatile oils, acetone, dimethyl sulfoxide, 95 % ethanol, methanol, toluene, ether, absolute alcohol, chloroform, olive oil, turpentine, carbon disulfide, dichloroethane, organic solvents, petroleum ether, hydronaphthalenes, and 1,2-dichloroethane. Slightly soluble in petroleum ether.
Odor Threshold:	0.003 ppm

10. STABILITY AND REACTIVITY

Stability:	X Stable _____ Unstable
	Stable at normal temperatures and pressure.
Conditions to Avoid:	Avoid heat, flames, sparks, and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.
Incompatible Materials:	Halogens, combustible materials, acids, oxidizing materials, metals, and metal salts.
Fire/Explosion Information:	See Section 5, "Fire Fighting Measures".
Hazardous Decomposition:	Oxides of carbon and hydrocarbons.
Hazardous Polymerization:	_____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data: **Toluene**
Man, Oral LD_{LO}: 719 µL/kg
Man, Inhalation TC_{LO}: 100 ppm
Rat, Oral LD_{50}: 636 mg/kg
Human, Inhalation TC_{LO}: 825 mg/m^3 (6 h)
Human, Inhalation TC_{LO}: 750 mg/m^3 (8 h)

Tumorigenic, Reproductive, Mutagenic Data: Toluene has been investigated as a reproductive and mutagenic effector.

Toxicity Data: **Naphthalene**
Human, unreported LD_{LO}: 29 mg/kg
Rat, Oral LD_{50}: 490 mg/kg

Carcinogen Status: Naphthalene is listed by NTP as an "Anticipated Human Carcinogen". Listed by IARC as a "Human Inadequate Evidence", "Animal Sufficient Evidence", Group 2B. Listed by ACGIH as A4 – "Not Classificiable as a Human Carcinogen".

Tumorigenic, Reproductive, Mutagenic Data: Naphthalene has been investigated as a tumorigenic, reproductive, and mutagenic effector.

Health Effects (Acute and Chronic): See Section 3: "Hazards Identification" for potential health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: High toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations. Toluene is subject to disposal regulations, U.S. EPA 40 CFR 262, Hazardous Waste Number U220. Naphthalene is subject to disposal regulations, U.S. EPA 40 CFR 262, Hazardous Waste Number U165.

14. TRANSPORTATION INFORMATION

U.S. DOTand IATA: Toluene; UN1294; Hazard Class 3; Packing Group II, Excepted Quantity (1.3 mL × .3)

15. REGULATORY INFORMATION

U.S. Regulations: CERCLA Sections 102a/103 (40 CFR 302.4): Toluene: 453.6 kg (1000 lbs); Naphthalene: 45.36 kg (100 lbs)..

SARA Title III Section 302 (40 CFR 355.30): Toluene and Naphthalene are not regulated.

SARA Title III Section 304 (40 CFR 355.40): Toluene and Naphthalene are not regulated.

SARA Title III Section 313 (40 CFR 372.65): Toluene. Naphthalene.

OSHA Process Safety (29 CFR 1910.119): Toluene and Naphthalene are not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes.
CHRONIC:	Yes.
FIRE:	Yes.
REACTIVE:	No.
SUDDEN RELEASE:	No.

State Regulations:	California Proposition 65: Toluene is known to cause developmental toxicity (1991). Naphthalene is known to cause cancer (2002).	
CANADIAN Regulations		
WHMIS Classification:	Not determined.	
EUROPEAN Regulations		
EC Classification (assigned):	F	Highly Flammable.
	Xn	Harmful.
	Xi	Irritant.
	N	Dangerous for the environment.
	Toluene:	Reproductive Toxin Category 3.
	Naphthalene:	Carcinogen Category 3.
EC Risk Phrases:	R11	Highly flammable.
	R22	Harmful if swallowed.
	R38	Irritating to skin.
	R40	Limited evidence of a carcinogenic effect.
	R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
	R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
	R63	Possible risk of harm to the unborn child.
	R65	Harmful: may cause lung damage if swallowed.
	R67	Vapors may cause drowsiness and dizziness.
EC Safety Phrases:	S2	Keep out of reach of children.
	S36/37	Wear suitable protective clothing and gloves.
	S46	If swallowed, seek medical advice immediately and show this container or label.
	S60	This material and its container must be disposed of as hazardous waste.
	S61	Avoid release to the environment.
	S62	If swallowed, do not induce vomiting. Seek medical advice immediately and show this container or label.
National Inventory Status		
U.S. Inventory (TSCA):	Toluene:	Listed on inventory.
	Naphthalene:	Listed on inventory.
TSCA 12(b) Export Notification:	Toluene:	Not listed.
	Naphthalene:	CAS No: 91-20-3 Section 4

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Toluene*, 15 September 2005
MDL Information Systems, Inc., MSDS *Naphthalene*, 15 September 2005.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.